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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,121	10/15/2001	Mark N. Kawaguchi	005794	3777
32588	7590	12/23/2003	ALRT/ETCH/CONE/	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			EXAMINER OLSEN, ALLAN W	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/978,121	<b>Applicant(s)</b> KAWAGUCHI ET AL.
	<b>Examiner</b> Allan W Olsen	<b>Art Unit</b> 1763

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 03 October 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 5-8, 15, 16, 18-20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,403,436 issued to Fujimura et al (hereinafter, Fujimura).**

Fujimura teaches removing photoresist and etching residue with a plasma comprising a major component of H<sub>2</sub> and a minor component of H<sub>2</sub>O. Fujimura teaches using the H<sub>2</sub>/H<sub>2</sub>O plasma beneficially treats the metal surface that is exposed as a result of having etched a contact hole through a dielectric layer. Fujimura teaches a H<sub>2</sub>/H<sub>2</sub>O plasma is used to strip the photoresist that is used to provide the contact hole pattern to a dielectric layer. Fujimura teaches this same H<sub>2</sub>/H<sub>2</sub>O plasma is used to treat the metallic surface that is exposed at the bottom of the contact hole. Fujimura teaches that following the removal of photoresist and the treatment of the metal surface, the contact hole is filled by a metal (e.g. aluminum) deposition step (col. 7, ln 40 – col. 8, ln 12). Fujimura teaches that the by adding H<sub>2</sub>O to an H<sub>2</sub> plasma, the rate of photoresist removal is substantially increased (col. 4, lns 64-68). Fujimura teaches heating the substrate-supporting pedestal electrode to a temperature of 200°C (col. 3, ln 65). Fujimura teaches the capacitive coupling of the plasma excitation energy as well as the provision of microwave plasma excitation energy source (figure 2). Fujimura teaches applying RF bias power to the substrate (figure 2).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 9-16, 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimura in view of U.S. Patent 6,007,671 issued to Fujimura et al. (hereinafter, Fujimura '671).**

Fujimura does not teach that there are no ions are present in the reactive gas mixture flowing within the containing walls. Fujimura does not teach heating a surface with the reaction chamber to a temperature of at least 400°C.

Fujimura'671 teaches that the reactive gas constitution is that of neutral atoms and radical species (col. 4, lns 8-20). Fujimura'671 teaches heating the surfaces within a reaction chamber, such as the quartz showerhead (baffle) or reactor walls to a temperature of at least 443°C.

It would have been obvious to one skilled in the art to heat a surface within the reaction chamber to a temperature of at least 443 °C because Fujimura "671 teaches that this inhibits the adsorption of atomic hydrogen species upon the quartz reactor surfaces thereby blocking a pathway for the elimination of atomic hydrogen.

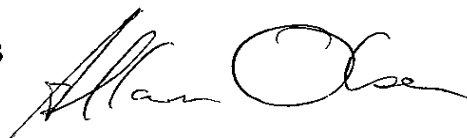
**Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills, can be reached on 703-308-1633. The general fax numbers for TC1700 are 703-872-9310 (non-after finals) and 703-872-9311(after-final). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.  
December 15, 2003

A handwritten signature in black ink, appearing to read "Allan Olsen", is written over a horizontal line.